DOINGWHATWORKS

# ALGEBRA PATHWAYS INVENTORY: WORKING WITH STRUGGLING ALGEBRA STUDENTS

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| **Purpose** | The algebra teachers in a school or district can use this self-assessment inventory to consider whether or not they are implementing practices that might help students who are struggling in algebra. If teachers have questions about the items in the inventory, they can review the various media pieces below that address how to work with struggling students. |
| **Materials** | None |
| **Media** | *Multiple Pathways to School Algebra,* multimedia overview (7:40)<br><br>*Algebra Boot Camp,* audio interview with the math department chair (4:47)<br><br>*Helping Struggling Learners in Algebra,* multimedia presentation by teacher from Castle View High School (6:19)<br><br>*Helping All Students Learn Algebra,* multimedia presentation by teacher from Terman Middle School (6:16) |
| **Topic** | National Math Panel: Major Topics of School Algebra |
| **Practice** | Multiple Paths |

# Algebra Pathways Inventory:

# Working With Struggling Algebra Students

This checklist is designed for the algebra teaching staff to reflect on how they are currently supporting students who are struggling with learning algebra and identify opportunities for providing additional support.

## Strengthening Student Preparation for Algebra

**Discuss:**

Are many students lacking basic arithmetic concepts? What are the persistent areas of weakness in student preparation for algebra?

**Examples:**

- Fluency with whole numbers and integers
- Fluency with fractions
- Operations and procedural steps
- Concepts of equality
- Problem translation

**Next Steps to Consider:**

- Strengthen articulation with K–8 mathematics foundations program (See DWW Topic: Critical Foundations for Algebra)
- Provide additional professional development for K–8 mathematics teachers and algebra teachers
- Develop intensive preparation experiences, such as summer school (See *Algebra Boot Camp* and multi-media overview)
- Analyze common errors in student work (See tool *Systematic Analysis of Student Errors)*

## Built-in Arithmetic Practice

**Discuss:**

How can teachers incorporate practice with underlying arithmetic concepts and procedures into algebra instruction?

**Next Steps to Consider:**

- Structure assignments to teach algebra concepts beginning with simplest underlying arithmetic, for example, linear equations using whole number examples prior to negative numbers prior to fractions (See *Helping All Students Learn Algebra*)
- Building a repertoire of algebra teaching exercises/problems that provide practice in concepts of arithmetic
- Develop structures and procedures to preview and practice the arithmetic procedures involved in algebra problems

| Instructional Strategies |
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| **Discuss:**<br>What classroom practices allow students to be successful in algebra? |
| **Next Steps to Consider:**<br>• Make explicit connections across mathematics concepts<br>• Scaffold by explaining concepts with incremental layers of complexity (See *Helping Struggling Learners With Algebra*)<br>• Teach algebra vocabulary explicitly<br>• Incorporate group work (See *Helping All Students Learn Algebra*)<br>• Collect contextual tasks to demonstrate and apply algebraic concepts<br>• Build in opportunities for students to discuss and explain their reasoning<br>• Participate in Lesson Study with other mathematics teachers |

| Feedback and Communications |
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| **Discuss:**<br>How might you augment or modify the types of feedback you provide to students? How are effort and persistence portrayed to students in order to learn algebra? |
| **Next Steps to Consider:**<br>• Critically examine student work for next steps in the learning of algebra<br>• Ensure that grading practices emphasize development of proficiency (See *Helping All Students Learn Algebra)*<br>• Provide multiple opportunities for students to revisit problems and re-learn procedures<br>• Investigate other ways to monitor how students are learning algebra |